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Europe, Caucasus and Central Asia (F2F ECCA)

Under Leader with Associates Cooperative Agreement EDH-A-00-08-0019-00

ECCA Impact Assessment/Case Studies of selected Farmer-to-Farmer Hosts

Submitted: October 29, 2013

CNFA Cultivating Entrepreneurship

FARMER-TO-FARMER

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1. Executive Summary

This report was commissioned to primarily highlight quantifiable impact from the five years of the Farmer to Farmer (F2F) Program in the Eastern Europe, Caucasus, and Central Asia (ECCA) region, encompassing Georgia, Tajikistan, Moldova, Belarus, Kosovo, Uzbekistan and Ukraine. Due to time and geographic constraints, this assessment focused on F2F core countries of Georgia and Tajikistan. The goal of this assessment is to trace the impact of volunteer assignments fielded by CNFA in the two core countries of Georgia and Tajikistan from 2008-2013. Hosts were selected by CNFA's in-country staff where, in their opinion, significant changes had taken place as a result of volunteer recommendations. Complete selection criteria for hosts and methodology for assessing volunteer impact are described in Section 3 below.

In Sections 4-5, the report discusses in detail the quantifiable impacts that can be attributed to volunteers' recommendations. These "case studies", include background information on the hosts, summaries of volunteer activities and discussions of the changes that have taken place as a result of volunteer assignments.

In comparison to other F2F programs, the evaluator found hosts in Georgia and Tajikistan to receive fewer volunteers, on average two, than other F2F regions and for the assignments to be more technical in nature. While F2F assignments are by nature designed to be iterative, sometimes the needs of hosts are fragmented. The F2F program in ECCA clearly demonstrates the beneficial effects a single volunteer assignment can have on a company's future business prospects.

The evaluator visited six hosts in Tajikistan from July 29th to August 3rd. Hosts were all located in the Northern part of the country in the districts of Asht, Isfara and Bobojon Gafurov and consisted of a farmer's association, apricot farmers, a beverage company and a greenhouse operator. Excerpts of quantifiable impact attributed to volunteers and identified by the evaluator in Tajikistan are found below:

As a result of volunteers' training on proper pruning and pest management, the Association of Agricultural Product Producers was reporting a decrease in losses from 60% to 25% and prices had increased more than 50%.

A volunteer's marketing recommendation s led to an increase in soft drink production from 900L to over 500,000L. Furthermore, Zoda's increased brand recognition helped it become Tajikistan's two-time soft drink of the year.

In Georgia, the evaluator visited seven hosts in from August 5th through 9th. The hosts selected were located throughout the country and covered both F2F supported value chains of dairy and fruits/vegetables. The hosts consisted of one farm service/machinery service center, a large food processor, three greenhouses, and two cheese producers. Examples of quantifiable impacts attributed to volunteers are found below:

Senior management attributes a volunteer's website and marketing strategy with increasing clients from 6,000 to more than 8,000 and in doubling sales from 6,000 GEL to more than 1,200,000 GEL.

Following volunteers' recommendations to increased production resulting in a 30% increase in meat purchased from local farmers.

Due to increased demand for milk, Tsalka will begin to purchase 6,000L of milk per day, up from 3,500L, resulting in new purchase agreements for more than 50 local dairy farmers. This increase in milk buying will inject more than 1125 Gel/day into the local dairy economy.

2. Introduction

The John Ogonowski and Doug Bereuter Farmer-to-Farmer (F2F) Program is a five year, $7.5 million activity funded by the United States Agency for International Development (USAID). This report presents the results of an impact assessment of selected F2F hosts in Eastern Europe, the Caucasus and Central Asia (ECCA) encompassing Georgia and Tajikistan. While the F2F program works in seven countries, due to time and geographic constraints, Georgia and Tajikistan were chosen to be the foci of this assessment.

The F2F Program works closely with USAID Missions, local organizations and the private sector to generate rapid, sustained economic growth in the agricultural sector through short-term technical assistance provided by US volunteers. In addition, the F2F Program works to increase the American public's understanding of international development issues and programs by providing opportunity for people-to-people interaction in agricultural development activities. Volunteers are provided along targeted value chains and support farmer cooperatives, agro-processors, financial institutions and industry associations adopt new technologies, develop market linkages, improve production practices and develop local capacity.

During discussion with USAID the following value chains were prioritized in each country in the ECCA Region:

Tajikistan: Fruits, Vegetables, Livestock, and Dairy

Georgia: Fruits, Vegetables, and Dairy

The following section summarizes the approach used for the selection criteria of hosts and the assessment that examined direct economic impacts for the host organizations. The process and most notably the field visits are also briefly described.

The next two sections feature the six case studies from Tajikistan and Georgia. The case studies include background information on the hosts, summaries of the volunteers' activities and the discussion with the hosts' management about the changes that have taken place as a result of the F2F program.

3. Methodology

The evaluator travelled to Tajikistan and Georgia from July 29-August 9 to assess the impact of CNFA's F2F program on specific hosts that had been chosen by CNFA's country directors. The criteria used for selecting hosts were the following:

- Hosts that have really benefited from volunteer assistance and can be considered as success stories;
- Hosts that can show some indicators for sales generated, profits increased (quantifiable successes); and
- Hosts that impacted a relatively large number of beneficiaries

On average the evaluator looked at 15% of the hosts in any defined country. Given the time constraints it must be noted that this is a sample of the above criteria.

In this region, the evaluator looked at six hosts per country. In principle, the mode of action of the evaluator was to visit with the Country Director on arrival to discuss the logistics of the visits and assess all current documentation on the chosen hosts. The evaluator specifically looked at the initial Organization Capacity Assessment Tool (OCAT), host profile, volunteer scopes of work and volunteer trip reports. The evaluator then tracked the assignments to a snapshot of specific achievements by the host that can be related to the volunteers input at the time of the evaluator's visit.

The evaluator would then travel and interview the senior management of selected hosts. The methodology of the interviews was to discuss the general and current state of the host from an agribusiness perspective and understand, if any, their businesses' development over the past five years. Utilizing this information, the interviews then concentrated on the relationship between that development and the volunteers' assignments. Additionally, questions were asked of the host to understand if there were other influences, unrelated to the volunteers' assignments, which have improved their business and acted as an additional catalyst their development.

At the end of each country visits the evaluators met again with the country director in their offices to interview him/her on their impressions of the host visited and give the country director a debrief on their findings.

4. Tajikistan Case Studies

The evaluator visited six hosts in Tajikistan from July 29-August 4. The six hosts selected consisted of three apricot producers, one beverage company, a greenhouse operator and an apricot producers' association. Hosts were all located in the Northern part of the country in the districts of Asht, Isfara and Bobojon Gafurov. F2F volunteers have been supporting the fruit/vegetables and livestock/dairy value chains; however, due to the overlap of the evaluator's visit with the grazing period for the cattle, only fruit/vegetables hosts were visited. Below is a map of hosts visited by the evaluator.

*****Author's Note: Due to the interrelated relationship of the two hosts, Dary Prirody Tajikistana and Zokhidov Dekhan Farm, the CNFA Tajikistan office arranged for the two interviews to be held concurrently. After discussing with the hosts, it was evident that the volunteers' trainings and subsequent impacts were integrated and therefore, their case studies are being combined.

Dary Prirody Tajikistana and Zokhidov Dekhan Farm

Background: The Association of Agricultural Product Producers "Dary Prirody Tajikistana" was founded in 2004 by two fruit processing companies Tajfruit and Noni Isfara. The Association is currently made up of 160 small and medium sized dekhan farms that focus predominately on the production of apricots. The main source of income for association farmers is the sale of fresh and dried apricots, with approximately 20% of apricots being sold in the fresh markets of Isfara and Khujand and the remaining 80% dried and packaged for sale. The association generates revenue through membership fees, the leasing of two previously granted processing lines to Tajifruit and through the bulk sale of members' dried apricots. Members tend

to sell their highest quality apricots on the fresh market and then dry and sell their lower quality fruits to the association. In the Summer of 2010, F2F approached the association to explore their interest in receiving technical assistance via the provision of F2F volunteers. The head of the association welcomed the idea, recognizing the utility of having access to advanced agronomical practices from American experts. The association expressed need for improved orchard management to reduce diseases and improve yields, as well as improved water usage. Farmers are currently utilizing ditch irrigation which results in flooded fields and reduces their production potential. As a result, every year association members are increasing their expenditure on water. The host strategy was approved in September 2010, and CNFA has since provided two volunteers to the association and two to association member Zokhidov Dekhan Farm.

List of CNFA Volunteers

Dari Prirodi Tajikistana and Zokhidov Dekhan Farm Volunteer Table			
Assignment	Volunteer	Dates	SOW
1	Dr. Wayne Williams	May 1, 2011-May 20, 2011	Apricot pruning and production
2	Kyung H Yoo	June 14, 2011-June 23, 2011	Drip irrigation design
3	Dr. Wayne Williams	April 14, 2012-May 5, 2012	Apricot production improvement
4	Ross Penhallegon	Sept 1, 2012-Sept 17, 2012	Care for apricot orchards in the autumn period

Wayne Williams' assignment focused on pest management and disease control of the apricot orchards with an emphasis on improving quantity and quality. Mr. Williams conducted five field based seminars, a noted departure from other NGOs which only discussed theory, to an average of 50 participants per seminar. A member from each of the association's farms participated in at least one of the seminars. Mr. Williams' seminars focused on proper pruning techniques of older trees, integrated pest management (IPM) and spraying techniques to limit the damage that insects cause to the trees. Mr. Williams' trainings focused in particular on how to mitigate the risks of *Monilinia fructicola*, the causal agent of brown rot. In addition, Mr. Williams brought soil testing kits and provided soil analyses for 10 farms.

Mr. Williams also visited Zokhidov Dekhan Farm under a separate assignment. Mr. Williams' objective was to train Zokhidov staff in modern and high grade apricot pruning, demonstrate non-expensive means of controlling pests and increasing the overall production and quality of apricots produced.

The objective of Kyung Yoo's assignment was to design a micro-sprinkler irrigation system, provide layout and cost estimates and present the principles of irrigation and micro irrigation to

association farmers. Mr. Yoo designed a micro-sprinkler irrigation for a 6.6 HA apricot orchard at association member's "Lmkon" farm to be used as a demonstration for association members.

Ross Penhallegon also visited Zohidov Dekhan Farm and other association members' orchards in the Fall of 2012. Mr. Penhallegon's assignment focused on demonstrating proper care for orchards in the non-producing autumn period. Mr. Penhallegon focused on appropriate caring methods for young orchards and proper pruning and forming of apricot trees after harvesting to increase yield. In addition, Mr. Penhallegon provided grafting demonstrations on 10 orchards to produce higher yielding, disease resistant varieties. Due to the time lag associated with apricot trees, none of these grafted trees have flowered prior to the evaluator's visit; however, the association and its members seemed very positive about their potential.

Discussion with Host: The evaluator met with the association's director and Zokhidov's owner on August 1 and it was made clear to the evaluator that volunteers' recommendations had made changes to the association and its members on multiple levels. As a result of volunteers' training on proper pruning and pest management, association members were reporting a decrease in losses from 60% to 25%. While 25% losses is still high, farmers attribute the lack of available water as the main contributor to these losses rather than pests and diseases. The association indicated that the volunteers' pruning techniques led to increased yield, higher market price due to increased quality and an increase in profit margin due to lower input costs. The association reported increased sales to the Tajik Fruit Company from 741,312 to 930,994[1] somoni after implementing volunteers' pruning techniques and association member Zokidov Farm stated that their yield had doubled and prices had increased 50-75% (depending on the variety). Additionally, volunteers recommended lower cost and safer alternative methods to disease and pest control. As a result, Zokidov Farm indicated and that he was spending $2,000 less on chemical spraying, while achieving more robust results. Furthermore, as a result of his increased production, Zokidov has increased the number of employees from 10 to more than 35.

"I thought I was doing everything right, but after volunteers came, I've changed 80% of my farming approach. Now my yields are double and I'm producing higher quality apricots which command a higher price."

Zokidov Dekhan Farm Owner

Realizing the benefits of proper pruning, the association has begun to offer pruning services to its members, free of charge, and to non-members for a nominal fee. This new service has brought in $500 in additional revenue to the association and will have pervasive impact on apricot yields and quality in the Isfara district. Additionally, a volunteer gifted 16 pruners to the association which has reduced the time of pruning from 10 days/ha to 2 days/ha.

[1] Association manager indicated that these were the "official" numbers and that in reality sales had increased significantly more.

Recognizing that water was a critical limiting factor in apricot production, the association requested a drip irrigation specialist to design a micro-sprinkler irrigation system. This volunteer designed a drip-irrigation system for Zokidov Farm and is currently installed on 2 ha of his orchard. The drip-irrigation system cost Zokidov Farm $1,300/ha and he reports a 40% increase in yield over non-irrigated land. Zokidov Farm has transformed his irrigated land into a demonstration farm with sign postings to educate other farmers on the benefits of drip irrigation. Furthermore, Zokidov Farm has used the volunteer's design to install drip irrigation systems on two other association members' farms, resulting in increased yield and a new income stream.

Zoda

Background: Zoda is a medium sized soft drinking producer operating in Tajikistan's second largest city Khujand. Starting in 2005, the owner began by producing dog rose compote out of his kitchen. Today, Zoda sells more than 500,000L across Tajikistan's largest markets, Duchanbe and Khujand, and has expanded its product line to include apricot compote, cherry concentrate and apricot concentrate. Zoda sources its raw materials from local farmers and now operates on 2ha of land and has purchased a near modern Chinese processing facility. In the winter of 2009, the owner approached F2F about receiving volunteer technical assistance to develop a marketing strategy, new product lines and develop a financial management system. Zoda's host strategy was approved in January 2010 and subsequently, F2F has fielded three volunteers on four assignments.

List of CNFA Volunteers

Zoda Volunteer Table			
Assignment	Volunteer	Dates	SOW
1	Brian Dodson	July 28, 2010-Aug 12, 2010	Marketing and business plan development
2	Tommy Lee	Nov 16, 2010-Dec 2, 2010	Soft drink production
3	Brian Dodson	Dec 3, 2011-Dec 19, 2011	Marketing and sales development
4	Brian Coffey	Feb 1, 2012-Feb 14, 2012	Economic modeling

Brian Dodson visited Zoda twice and his assignments developed a strategic vision, marketing strategy and business plan for Zoda. Mr. Dodson worked with Zoda's management team to rebrand their product as being "natural" and trained their marketing department to actively promote their product and accurately assess demand. Additionally, Mr. Dodson instituted price and product segmentation to increase Zoda's product diversification and to capture upscale and lower end consumers.

Tommy Lee's assignment focused on introducing new technologies to Zoda to equip them with the ability to produce new products. In addition, Mr. Lee focused on improving Zoda's production line to minimize losses and increase the shelf life of the final product.

Brian Coffey scope of work focused on developing an economic and business model for Zoda. Mr. Coffey constructed a full economic model of Zoda and created financial software for Zoda to track indicators such as variable cost per product and break-even levels of production. Additionally, Mr. Coffey taught Zoda's accountants to properly keep financial records and track production, sales, input purchases and inventory.

Discussion with Host: The evaluator met with Zoda's CEO, Rustam Abullozoda, at their processing plant located 20KM outside of Khujand. According to Mr. Abullozoda, the first volunteer developed a marketing strategy for Zoda that "transformed" their business. This volunteer created a brand image for Zoda, developed a promotional campaign and introduced product diversification to capture new markets. Under the volunteer's recommendation, Zoda has developed an active advertising strategy on TV and radio, installed banners in high-traffic areas and conducted free trials to win new customers. In addition, this volunteer created a price and product segmentation strategy to capture consumers in the high and low end markets. Zoda now boasts 13 different products of dog rose component, all with different packaging to appeal to every segment of the population. Furthermore, this volunteer created a separate marketing department, solely responsible for marketing Zoda's products in targeted regions. Marketing staff undergo training at Zoda's office and keep clear records of client sales to maximize efforts in profitable markets. As a result of increased marketing, Zoda's production has increased from 900L to over 500,000L, sales have ballooned to more than $400,000[2] and Zoda's products won best non-alcoholic soft drink in 2010 and 2012. Additionally, improved production and marketing has increased employment from six to 35.

Another volunteer focused on streamlining Zoda's soft drink production. Originally, Zoda sold its beverages in glass jars; however, due to increased demand for their products, Zoda purchased near modern Chinese equipment for producing plastic bottles. While Zoda is able to produce enough plastic bottles to meet demand, quality remains poor and the shelf life of the beverages has decreased from one year to less than two months. The volunteer analyzed Zoda's filling process and tested their equipment for contamination. The volunteer made recommendations to improve Zoda's sanitary practices such as proper head space, bottle washing and capping. Zoda now boasts more than $6,000 in product at any one time on the shelves of Tajikistan with a shelf life of close to a year.

"Prior to the volunteers, our businesses' stability was not so good. We were almost going to close. Now have won two beverage of the year awards and are present in most every major market in Tajikistan."

Rustam Abullozoda, Zoda CEO

Zoda's third volunteer created financial tools to increase Zoda's operational efficiency. The volunteer developed financial forecasting spreadsheets that equipped Zoda with the ability to calculate financial metrics such as variable cost per product, identify their break-even levels of production and predict profit/loss given varying production levels. As a result, Zoda operates at the appropriate production levels to maximize profitability and has ceased to produce beverages in unprofitable quantities. In addition, the volunteer transitioned Zoda from a paper based accounting system to excel, where they now track raw material costs,

[2] Zoda owner indicated that these were the "official" numbers and that in reality sales had increased significantly more.

inventory levels, sales by market and product, and cash flow. With these financial systems in place, Zoda was able to qualify for a line of credit to further expand its operations.

Zoda founder and CEO Rustam Abullozoda standing behind an array of his compote and concentrate juices. The decorative vases represent the 2010 and 2011 Tajik Soft Drink award for best non-alcoholic beverage.

Urunhojaev

Background: OJSC "Urunhojaev" is a medium scale tomato and cucumber producer in the Bobojon Ghafurov District near Khujand. Started in 2011, Urunhojaev currently operates 16 10x90 meter Chinese type greenhouses and produces tomatoes and cucumbers year-round. Produce is sold exclusively at the farm gate at an average price of 4 somoni/kg in the summertime and 20 somoni/kg in wintertime. Urunhojaev's greenhouses have gray-brown clay soil and employ a well-based drip irrigation system. Due to electricity shortages in the winter time, the microclimate in the greenhouses is variable depending on the weather. Because of the electricity issues and poor pest management and agronomic practices, Urunhojaev experiences over 30% losses in yield. In late 2011, the host approached F2F about receiving volunteers to improve their greenhouse management, soil quality and yields. Urunhojaev's host strategy was approved in January 2012 and CNFA has since provided two volunteers to support Urunjojaev's greenhouses.

List of CNFA Volunteers

Urunjojaev Volunteer Table			
Assignment	Volunteer	Dates	SOW
1	Mark Lichtenwalner	Mar 3-Mar 23, 2012	Tomato and cucumber husbandry in greenhouses
2	Matthew Mulanax	Aug 23, 2012-Sept 6, 2012	Preparing greenhouses for the new season

Mark Lichtenwalner visited Urunjojaev in the spring of 2012 to improve their agronomists' tomato and cucumber production techniques, teach best practices in plant fertilization, husbandry, and disease control and to demonstrate the proper usage of high quality seeds. Mr. Lichtenwalner brought soil testing kits from the U.S. and, for the first time, Urunjojaev's soil was analyzed and proper blends of fertilizer recommended. Furthermore, Mr. Lichtenwalner conducted a seminar with students at Khujand Polytechnic Institute, discussing tomato production in greenhouses, techniques in plant breeding and demonstrated vegetable plant grafting.

Matthew Mulanax's assignment taught the greenhouse managers to properly prepare their greenhouses for planting. Mr. Mulanax focused on pre-plant soil decontamination, proper application of fertilizer, seedling growing and soil preparation.

Discussion with Host: The evaluator visited Urunhojaev on August 2 and met with owner/agronomist Abduhamid Hoshimov. Mr. Hoshimov stressed the importance that the volunteers have had on improving their knowledge of greenhouse production. One volunteer brought with him a Mosser Lee soil testing kit from the U.S. and was able to analyze Urunhojaev's soil for nutrient deficiencies. The analysis indicated that Urunhojaev's soil was low in nitrates and phosphorous, but high in potassium. The volunteer subsequently

recommended a proper blend of NPK and manure to maximize yield. The volunteer also trained Mr. Hoshimov to mitigate the risks posed by disease and pests. Diseases found in the greenhouse include *Alternaria sp.* and leaf mold *Fulvia fulva*. The volunteer trained the agronomist to properly ventilate the greenhouses to remove excess humidity which stimulates fungal growth, and on proper fungicide application. To mitigate pests, particularly the whitefly *Bemisia argentifolii*, the volunteer implemented an IPM program. Urunhojaev's staff was trained to properly monitor and keep records of pests, place yellow sticky cards to detect pests early and properly apply insecticide. Additionally, the volunteer suggested introducing the wasp *Encarsia Formosa* to control the whitefly. As a result of volunteer's recommendations, Urunhojaev reported a decrease in losses from more than 30% to 8%.

Urunhojaev's second volunteer provided training on greenhouse preparation with an emphasis on soil sanitation to increase yields and mitigate pests. Prior to the volunteer's arrival, Urunhojaev's staff only added organic manure and plowed the soil without properly cleaning the greenhouse and soil. The volunteer trained Urunhojaev's staff in solarization, a nonchemical, environmentally sound and inexpensive method of soil sanitization. By increasing the soil's temperature, solarization kills many disease-causing organisms, nematodes and weed seedlings. Additionally, solarization improves soil structure and increases the availability of nitrogen in the soil, which the first volunteer found to be low. Furthermore, the volunteer recommended and demonstrated bio-fumigation, specifically mustard and broccoli plant material, to augment solarization and release chemical isothiocyanates to suppress soil-born pests and diseases.

As a result of F2F volunteer recommendations, Urunhojaev has seen a 75% increase in production from 3MT to 7MT per greenhouse and sales have increased from $7,000 to $49,000. Due to increased profitability and renewed confidence, Urunhojaev has invested more than $100,000 since volunteer assistance began to construct an additional 6 greenhouses. To manage and harvest the additional production, Urunhojaev has hired an additional 14 employees, bringing their total to 20, of which 90% are women.

Akmal Dekhan Farm

Background: Established in 1999, Akmal Dekhan Farm focuses on apricot production on 21 HA in the Asht District of Northern Tajikistan. Akmal utilizes well water for irrigation; however, their current irrigation system is ineffective surface irrigation with open ditches. Akmal grows four main varieties of apricots: 1) "May" which is an early variety that commands a higher price; 2) "Mirsanjali", a high sugar variety ideal for drying; 3) "Boboi" a popular local variety; and 4) "Khurmoi". Because of lack of appropriate pruning, Akmal's trees are more than six meters high, significantly reducing the yield and quality of apricots produced. Furthermore, Akmal's trees suffer from *Monilinia fructicola*, a common fungus causing brown rot in stone fruits, significantly reducing yields and quality. Having participated in a F2F training in the region, Navruz Karimov, the owner of Akmal Dekhan Farm, requested F2F assistance in orchard management.

List of CNFA Volunteers

Akmal Dekhan Farm Volunteer Table			
Assignment	Volunteer	Dates	SOW
1	Brian Flanagan	Mar 27, 2012-Apr 12, 2012	Apricot orchard management

Brian Flanagan visited Akmal Dekhan Farm in the Spring of 2012 to train farmers in proper orchard management, including pruning, fertilizer application and young plant husbandry. In addition, Mr. Flanagan's assignment focused on disease and pest control to treat and mitigate brown rot, aphids, mites and the flat headed root borer *Capnodis*.

Discussion with Host: While Akmal Dekhan Farm only received one volunteer, it was evident to the evaluator the high impact that a three week assignment can have on a host. The volunteer provided pruning demonstrations to Akmal's staff and local farmers emphasizing the importance of making clean cuts at 60 degrees to decrease the probability of disease infection and to make stronger branches capable of supporting larger fruits. To help mitigate pests and disease, the volunteer recommended removing dead trees, painting the trunk of trees with white latex paint to control borers from penetrating the base of the trunk, pruning canker infected branches and utilizing a relatively inexpensive dormant oil spray. As a result of following the volunteer's recommendations, the number of trees infected with brown rot and other diseases are reduced from 200 to less than 10. Most importantly, farmers are now able to detect diseased trees and subsequently provide care. The new information provided by the volunteer on pest detection and spraying "saved" Akmal's harvest last year, as their trees became infected with the "Apricot Elephant" and threatened Akmal's entire harvest.

The host also described the importance the soil test and subsequent fertilizer recommendations have had on his harvest. The volunteer performed Akmal's first soil test and recommended proper NPK formula to combat the soil's high alkaline content- PH 8.2.

As a result of following the volunteer's recommendations on pruning, pest and disease control and fertilizer application, Akmal Dekhan Farm has seen its production of fresh apricots increase

from 51MT to 67MT. Due to higher quality, Akmal now sells their apricots for 4 somoni/kg versus 2 somoni/kg, resulting in an increase in come from 102,000 somoni to 268,000 somoni. Additionally, Akmal Dekhan Farm now dries surplus apricots and sold 15MT last season for nine somoni/kg, representing an additional 135,000 somoni in income. Due to increased labor requirements, employment has almost doubled from 80 to 150 during harvesting period.

Amir Dekhan Farm

Background: Started in the mid 1990's, Amir Dekhan Farm is a 40HA fruit orchard in the Asht District, producing apricots, plums, dog rose and peaches. Amir's orchard contains 6,240 apricot trees, comprised mainly of the "May" variety. Due to the combination of high temperatures and rocky soils, the Asht District can solely grow the "May" variety which is harvested two-three weeks earlier than other varieties grown in Central Asia. This provides these apricot farmers a price premium as they can bring their product to market with limited competition.

While Amir Dekhan Farm has abundant potential due to its land size and ability to harvest the "May" variety, the farm's returns are diminished due to the common problems of poor water availability and orchard management. To irrigate his orchard, Amir Dekhan Farm utilizes water from a local river that is pumped by five soviet era pump stations that are ineffective and inefficient. Frequently, the owner of the pumping station does not collect enough money to operate the pumps and therefore, Amir's farm remains not irrigated. Nonetheless, even when water is pumped from the river, Amir utilizes an expensive and ineffective open ditch system, leading water to be the most expensive factor of production. With regards to pests and diseases, Amir experiences losses of up to 40% due to brown rot, bacterial cankers, shot hole disease and *eutypa dieback*.

Amir's owner, Pulod Ashurov, contacted F2F to receive volunteer technical assistance to increase Amir's quantity and quality of apricots. CNFA sent two volunteers to Amir Dekhan Farm, the first to design and install a drip irrigation system and the second to provide training in proper orchard management.

List of CNFA Volunteers:

Amir Dekhan Farm Volunteer Table			
Assignment	Volunteer	Dates	SOW
1	Robert Morris	Feb 2, 2010-Feb 19, 2010	Drip irrigation
2	Dr. Wayne Williams	Apr 16, 2010-May 5, 2010	Apricot production

Prior to Robert Morris' assignment, Amir Dekhan Farm invested $15,000 in a drip irrigation system consisting of 19,500 meters of piping, three water tanks with a volume of 200 cubic meters and a reservoir with 120,000 cubic meters capacity. However, due to lack of knowledge and the absence of qualified specialists, this equipment remained unused. Robert Morris' assignment focused on using Amir's existing equipment to design and install a drip irrigation system to increase the quality and quantity of apricots and lower Amir's cost of production.

Dr. Wayne Williams' SOW concentrated on improving Amir's orchard management with a strong emphasis on pruning, fertilizer application, identification of pests and disease, and

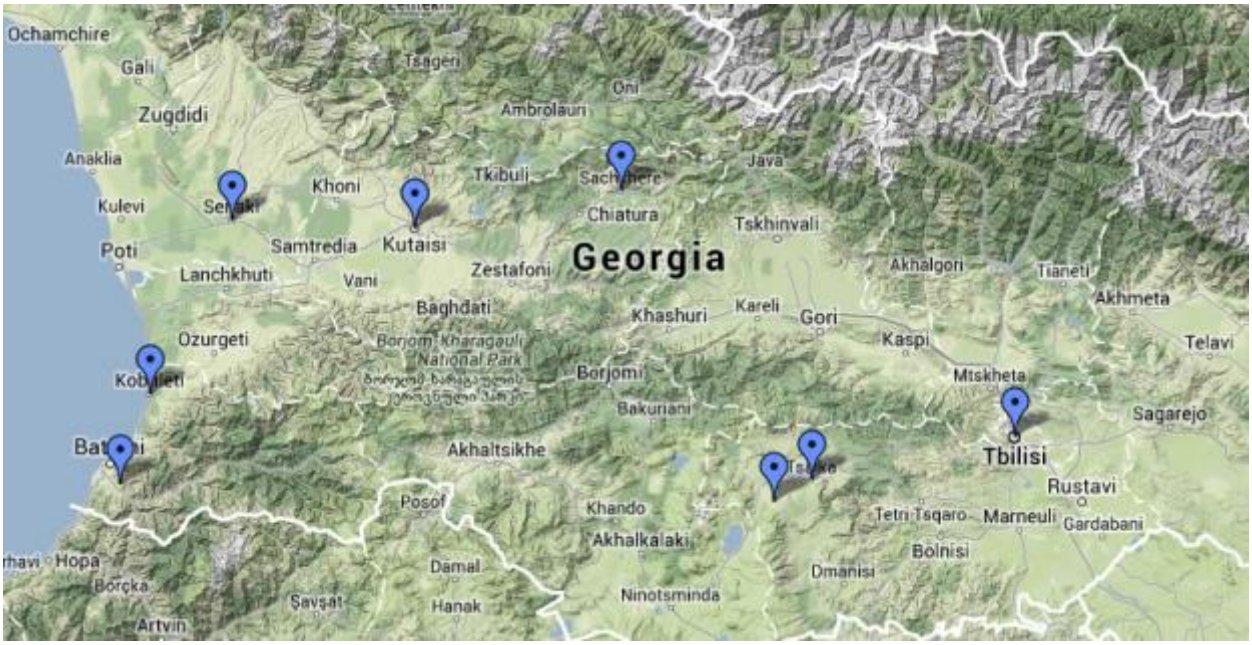
marketing. In addition, Dr. Williams taught two extension classes to local farmers on proper pruning techniques and pest diagnosis and conducted soil analyses on six local farms.

Discussion with host: The evaluator traveled to Amir Dekhan Farm and met with the owner Mr. Pulod Ashurov. An accomplished businessman, Mr. Ashurov, directed much of his recent success to following the volunteers' recommendations. This assignment was Mr. Williams fourth in the region and because of his knowledge of the common pests, production practices and soil, Mr. Williams was able to quickly assess and make recommendations to benefit Amir Dekhan Farm. Mr. Williams provided training in properly pruning apricot trees, and as a result, Amir Dekhan Farm's yields have doubled and the quality of fruit has improved. Subsequently, Amir Dekhan Farm is able to sell their apricots for 4 somoni versus their previous price of 1.5 somoni. In addition, Mr. Williams assessed the content and condition of the soil and recommended a proper fertilizer blend that is still being used today. And, after following the volunteer's IPM recommendations, Amir Dekhan Farm reported a reduction in losses due to pests from 40% to only 10%.

Mr. Williams also assisted Mr. Ashurov in writing a grant application for a truck terminal and cold storage facility to store and transport the "May" variety of apricots. The proposal was eventually funded by USAID's ProAPT Project through a $30,000 matching grant. This facility currently employs 65 people, of which 53 are women, and transported 875MT of apricots, worth $713,000, last year.

5. Georgia Case Studies

The evaluator visited seven hosts in Georgia from August 5th through 8th. The hosts selected were located throughout the country and covered both F2F supported value chains of dairy and fruits/vegetables. The hosts consisted of one farm service/machinery service center, a large food processor, three greenhouses, and two cheese producers. Compared with previously visited F2F countries, hosts in Georgia are considerably higher up the value chain and, in the opinion of the evaluator, illustrates the ability and value of F2F to work at both the enterprise and primary production points in the value chain. Below is a map of the hosts visited in Georgia.



Alva LLC

Background: Established in 2005, Alva LLC provides machinery, inputs, and veterinary supplies to farmers throughout Western Georgia. In 2009, Alva received a $50,000 matching grant through the CNFA implemented Agribusiness Development Authority to establish a Farm Service Center in Georgia's Sachkere district. This Farm Service Center provides chemicals, fertilizers, agricultural tools and veterinary medicines to more than 10,000 farmers. Alva's farm service center is staffed with agronomists and veterinarians whom provide in store consultations for clients and conduct demonstrations in the Farm Service Center's training room and adjacent demonstration farm.

In 2011, Alva received an additional matching grant from USAID's Accessing Mechanization Program (AMP) to establish a Machinery Service Center which provides plowing and other cultivation services to farmers. Together Alva's Farm Service Center and Machinery Service Center provide a one stop shop for farmers to purchase all their agricultural needs. Alva's sales consist of 50% chemicals, 30% mechanization services and 20% veterinarian supplies.

List of CNFA Volunteers

Alva Volunteer Table			
Assignment	Volunteer	Dates	SOW
1	Dr. Katherine Lambarth	Nov 24, 2011-Dec 1, 2011	Veterinary consultancy service improvement
2	Clint Goss	Jan 21, 2012-Feb 6, 2012	Marketing strategy development
3	Vera Shanov	Jan 21, 2012-Feb 6, 2012	Farm Service Management Improvement
4	Roger Engstrom	June 25, 2013-July 7, 2013	Improvement of maize production

Dr. Katherine Lambarth's SOW was to provide training and demonstrations to Alva's veterinarian staff in livestock and cattle husbandry, diagnostics and breeding. Dr. Lambarth held a seminar with 10 participants, including four local veterinarians, to discuss appropriate and timely treatment of sick animals, early identification of disease and diagnostic services, feed and nutrition and livestock sanitation issues. In addition to the seminars, Dr. Lambarth visited Alva's clients to provide on-farm demonstrations in proper antibiotic administration.

Clint Goss and Vera Shanov traveled together to develop a marketing and advertising strategy to increase Alva's client base and outreach. These volunteers designed a website for Alva, www.alvafsc.com, created pamphlets, newspaper ads and recommended TV advertising. Furthermore, the volunteers developed customer appreciation days to promote products and foster customer loyalty.

Roger Engstrom assignment focused on training Alva's staff in hybrid maize production. In 2012, Alva began stocking hybrid Pioneer maize and planted three HA to serve as a demonstration field. However, Alva's agronomists were inexperienced in hybrid maize cultivation and the demonstration field's yields were below expectations. Mr. Engstrom trained Alva's agronomists on proper seed placement, proper inter-row cultivation, soil preparation and irrigation.

Discussion with Host: The evaluator traveled to Alva on August 6th and met with Alva's Operations Manager Iza Komladze. Ms. Komladze iterated the importance that the volunteer technical assistance has had on their operations and specifically cited the website design as a "game changer". Two volunteers visited Alva concurrently to overhaul their marketing strategy and subsequently designed a website to increase Alva's outreach and client base. In addition to the website, the volunteers redesigned Alva's marketing brochure, created Alva's tagline, "Alva- We know how to help you", recommended the distribution of samples to increase sales from existing customers and to develop low cost giveaways such as an Alva calendar to create brand

recognition. The website launched in early 2012 and Ms. Komladze credits the website and improved advertising with the increase in clients from 6,000 in 2011 to more than 8,000 in 2012 and a doubling in sales from 600,000 GEL to more than 1,200,000 GEL.

Another volunteer provided classroom and on-farm training to augment Alva's veterinarian services and build the capacity of local veterinarians. The volunteer trained veterinarians and farmers in the early detection of common livestock diseases such as Clostridial disease, Classical Swine Flu, pregnancy toxemia in pregnant ewes, and coliform mastitis. The volunteer also discussed with farmers the importance of vitamin injections and antibiotics for their cattle and trained Alva and local veterinarians in their proper administration. As a direct result, Alva reports a double in clients administering antibiotics to their cattle. During farm visits, the volunteer worked with farmers on improving feed and nutrition for their cattle. The volunteer recommended increased calorie consumption for the livestock and suggested grinding maize to increase its feed value to the animals.

The final volunteer visited Alva one month prior to the evaluators visit; therefore, impacts are difficult to ascertain. This volunteer specifically worked with Alva's demonstration field which is currently highlighting two Pioneer varieties. The volunteer trained the agronomists on proper seed bed preparation for proper germination, weed control, and herbicide effectiveness. The volunteer indicated to the host that their most pressing problem for high yielding maize production was the un-even soil surface for effective flood irrigation. The volunteer gave four recommendations to alleviate the problem: 1) level the land with a .5% slope; 2) install sprinklers; 3) install a drip irrigation system; or 4) install a bubbler irrigation system. Of the four recommendations, the volunteer indicated to management that the bubbler irrigation system was the least expensive and easiest to manage; however, at the time of the evaluator's visit no action had been taken.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Gurmani Ltd

Background: Established in 1991, Gurmani is a meat and food processor specializing in traditional Georgian food such as khinkali, kebabs, meat pies, ground meat and kebabs. Gurmani currently has a chain of four retail stores serving Georgia's second largest city Kutaisi. To prepare their products, Gurmani purchases more than 80% of the required herbs, vegetables and meat from local farmers. In 2008, Gurmani received a $125,000 matching grant from the Agribusiness Development Activity to modernize their meat cutting and processing equipment. In 2009, Gurmani contacted F2F to receive volunteer technical assistance to help it achieve its goals of business expansion through improved meat processing technologies and to offer more products to Georgian consumers with improved quality.

List of CNFA Volunteers

Gurmani Volunteer Table			
Assignment	Volunteer	Dates	SOW
1	Clifford Wener	Aug 10, 2009-Aug 22, 2009	Meat processing technology
2	Zoltan Toth	May 18, 2010-May 29, 2010	Meat cutting technology improvement

Cliffor Wener's assignment was two-fold. First, Mr. Wener worked with management and staff to improve the sanitation and operational efficiency of Gurmani's processing system. Mr. Wener made recommendations on proper cooking and storage temperatures, thawing techniques and packaging. Second, Mr. Wener worked with Gurmani's management to introduce new product lines to improve market leadership, market share and profitability.

Zoltan Toth was Gurmani's second volunteer and the objective of his assignment was to introduce new meat cutting techniques and technologies to increase profitability and increase variety of production. Mr. Toth provided demonstrations and instructions to Gurmani's butchers on proper meeting cutting and food safety.

Discussion with the Host: The evaluator travled to Gurmani's processing plant and shop in Kutaisi and met with the owner, Jelini Gokadze. According to Mr. Gokadze, the first volunteer had significant impact on improving the shelf life of their products. The volunteer trained in the proper temperature for receiving, handling and storing meat. Additionally, the volunteer recommended sanitizing equipment with chlorine and to purchase a high pressure water spray system to prevent bacterial contamination. As a result of following the volunteer's recommendations, Mr. Gokadze stated that product waste reduced from 20% to 10%. Furthermore, Gurmani is now able to sell their products in markets further away and has subsequently opened up an additional store.

The first volunteer also worked with Gurmani to introduce two new product lines: pizza and salad. The volunteer provided recipes and trained staff in preparing various salads, pizza dough, sauces and marinades. As a direct result, Gurmani currently sells eight varieties of salads and three different types of pizza.

The second volunteer demonstrated proper meat cutting techniques to Gurmani's staff. The volunteer demonstrated the proper breakdown of over 300kg of pork and beef carcasses using cutting charts in Russian. The volunteer altered his technique to use the costumed ax instead of a traditional boning knife. As a result of utilizing proper cutting techniques Gurmani has reduced the amount of meat wasted and has been able to increase prices by 5% due to improved quality.

The improvements in Gurmani's operations have led to increased production resulting in a 30% increase in meat purchased from local farmers. In addition, Gurmani has added 22 new employees, bring their total to 52, and added one new shop in a suburb of Kutaisi.


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Zana Eco LLC

Zana Eco was established in 2010 and currently owns and operates two greenhouses totaling 6,500 square meters. The company heats the greenhouses utilizing thermal hot springs which release 400L of water a day. The greenhouses are equipped with drip irrigation, a central heating system and ventilation system. Zana primarily grows cucumbers and tomatoes and sells its produce to local markets. Due to a lack of management's knowledge in greenhouse production, their first harvest was entirely spoiled.

In addition to operating greenhouses, the owner of Zana, Koba Gvazava, also owns and runs the Gvaza Farm Service Center. Recently, Gvaza installed an express laboratory to offer soil analysis and consultations to its clients. Once operational, the soil tester will be able to identify nutrient deficiencies and allow Gvaza's agronomist to recommend the appropriate fertilizer composition.

List of CNFA Volunteers

Zana Eco Volunteer Table			
Assignment	Volunteer	Dates	SOW
1	Nino Adams	Sept 12-Sept 27, 2011	Greenhouse vegetable technology improvement
2	John Fouts	May 12- May 29, 2013	Soil analysis and improvement

Due to the fact that Zana is a start-up greenhouse and management is new to greenhouse vegetable production, Nino Adams' assignment focused on improving managements' knowledge of greenhouse production and retrofitting the greenhouse to increase quality and quantity. Nino focused her recommendations on improving the climate control, managements' strategies to control foliar and soil-born diseases, greenhouse sanitation and pest management.

John Fouts assignment was conducted only a few weeks before the evaluator visited the host and focused on training Gvaza's staff in proper soil testing methodology. John trained three staff members in general soil testing procedures and placed in emphasis on their installed LaMotte AST-15 Lab. Furthermore John trained the staff in proper lab cleanliness to ensure accuracy of test results.

Discussion with Host: The evaluator met with Zana and Gvaza's owner Mr. Koba Gvaza. According to Mr. Gvaza, the management team at Zana knew little about greenhouse management before F2F's assistance. Due to the lack of knowledge in proper climate control and pest management, all of their 2010 harvest was loss. F2F volunteer Nino Adams visited Zana and discovered three main problems: 1) polluted soil; 2) lack of temperature control; and 3) pests. To solve Zana's problems with polluted soil, Ms. Adams recommended potting tomato plants and

introduced a growing mixture of 45% peat, 20% manure, 5% chicken manure, 5% sow dust, and 20% perlite. According to Mr. Gvaza, Ms. Adams stressed the importance of temperature control to Zana's staff and recommended increasing the greenhouse's temperature to foster improved tomato growth. As a result, Zana now controls their temperature in the day to 24-27C and at night 17-20C for optimal production. Furthermore, Ms. Adams installed fans to reduce the greenhouse's humidity level to prevent foliar diseases. And to reduce pests, Ms. Adams trained Zana's staff in IPM. Common diseases affecting the greenhouse were Anthracnose, Alternaria solani and Phytophtora infestans. Ms. Adams trained the staff to prevent, identify, and treat these and other diseases. As a result of Ms. Adams' technical assistance, Zana produced 20MT of cucumbers and tomatoes in their second season. Additionally, Ms. Adams advice led Zana to reduce their fertilizer expenditures from 2,500 GEL to 1,200 GEL.

While Mr. Fouts' assignment was to recent for the evaluator and host to make any determination of its effect, it was evident from speaking with Mr. Gvaza that the soil analysis training will have significant economic impacts for the FSC and farmers. Mr. Fouts trained three staff members on full-cycle soil testing procedures. Prior to Mr. Fouts' training, the FSC staff members could only test for NPK levels, whilst now they are able to test for other essential nutrients such as magnesium and calcium. The FSC serves more than 6,000 farmers and Mr. Gvaza sees their new soil testing service as a profitable venture that will improve the yields and incomes of his clients.

VT Agro

Established in December 2010 by three Ukrainian investors, VT Agro operates 1HA of hydroponic greenhouses located in the Adjara Region of Georgia. While the owners are inexperienced in greenhouse production, local specialists have been hired to oversee daily operations. VT Agro focuses primarily in the production of tomato and bell peppers and sells to high-end super markets in Tbilisi.

The greenhouses are heated via natural gas and drip irrigation and ventilation systems have been installed. Despite more than $1M invested into the greenhouses, incorrect weather and environmental planning led to their collapse in the winter of 2012. The greenhouses were entirely rebuilt and currently .5HA is dedicated to tomato growing and an additional .5HA for bell peppers. Because hydroponic greenhouses are a new practice in Georgia, VT Agro requested F2F assistance to train their staff in hydroponic management and tomato production.

List of CNFA Volunteers

VT Agro Volunteer Table			
Assignment	Volunteer	Dates	SOW
1	Nino Adams	Dec 14-Dec 23, 2011	Greenhouse Hydroponic Tomato Growing

Nino Adams' assignment focused on training VT Agro's staff in proper hydroponic greenhouse management. Ms. Adams' training covered six areas: 1) improvement of company organizational structure; 2) improvement of climate control system; 3) pollination; 4) pruning; 5) nutrient program; and 6) pest and disease control.

Discussion with Host: The evaluator traveled to VT Agro's hydroponic greenhouse and met with their local chief agronomist. According to the agronomist, Ms. Adams redesigned their ventilation, irrigation and fertilizer program. Prior to Ms. Adams' assignment, the agronomist was applying NPK of 15:30:15 and now they are applying 20:20:20 to work more effectively with the magnesium and calcium in the soil. Ms. Adams also designed a new air circulation system which centered around fans to control humidity rather than inefficiently letting air escape from the top of the greenhouse. The agronomist went on to describe how Ms. Adams introduced bees to pollinate the tomato trees rather than simply shaking the plants. To improve the size of tomatoes, Ms. Adam trained the staff on pruning the plants to 3-4 flowers from 10-12. And to reduce the occurrence of fungus, Ms. Adams trained VT Agro's entomologist to rotate fungicide every 15 days.

Tsalka Dairy Products

Founded in 2012 with the help of a grant from Mercy Corps, Tsalka Dairy Products processes more than 3.500L of milk per day, producing 410/day of the popular sulguni and imeruli cheeses. Milk is purchased from more than 300 local farmers and their cheese is sold in the popular tourist city of Batumi. Tsalka Dairy Products contacted F2F about receiving volunteer technical assistance to expand their product lineup to include mozzarella and improve their sulguni and imeruli production.

List of CNFA Volunteers:

Discussion with Host: During the meeting with Tsalka Dairy Products' owner, it was made clear to the evaluator that the volunteer has had significant impact on operations and profitability. The volunteer's recommendatons focused on proper cheese cutting to reduce losses, not spoiling whey to increase quality of butter, mozzarella production, proper sanitation of equipment and the introduction of an improved rennet variety to speed up the cheese ripening process.

Daily Increase in Sales

New Butter sales: 150

New Mozzarella sales: 1150

Increased cheese sales*: 320*

Total: 1,620 Gel

As a result of following the volunteer's recommendations regarding cutting and cooking, yields have increased 4%. In addition, cheese production has increased from 410kg/day to 450kg/day, representing a 320 GEL increase in income per day. Furthermore, Tsalka is now able to sell 25kg of butter per day, representing an additional 150 GEL in income.

Now equipped with the knowledge to produce mozzarella, Tsalka plans to sell 100kg of mozzarella in the upcoming season. Mozzarella commands a higher price of 11.5 GEL, representing an increase of revenue of 1150 Gel per day. Due to increased demand for milk, Tsalka will begin to purchase 6,000L of milk per day, up from 3,500L, resulting in new purchase agreements for more than 50 local dairy farmers. This increase in milk buying will inject more than 1125 Gel/day into the local dairy economy.

Santa LLC

Santa LLC is a commercial dairy farm founded in 1997 and owns more than 200 Schwitz breed dairy cows. After receiving a grant from MCC's ADA program, Santa built a modern cheese processing plant and currently produces six types of cheeses from more than 2,500L of milk per day. Santa's cheeses are sold at higher end supermarkets such as Goodwill, Smart and Carrefour. To help expand its business, Santa contacted F2F to receive volunteer technical assistance in HACCP and gouda cheese production. Santa hopes that higher end gouda cheese will increase their revenues and HACCP certification will raise brand recognition and enable them to eventually export cheese to neighboring countries.

List of CNFA Volunteers

Santa Volunteer Table			
Assignment	Volunteer	Dates	SOW
1	Clifford Wener	Nov 2-Nov 14, 2009	HACCP training
2	Steve Morgan	Nov. 5-Dec. 5, 2010	Gouda cheese making

Santa's first volunteer, Clifford Wener, focused on training staff in Good Manufacturing Practices (GMP) and Sanitary Standard Operating Practices (SSOP) essential to becoming HACCP certified. In addition, Mr. Wener's assignment dealt with retrofitting Santa's processing equipment to meet international standards.

Santa's second volunteer, Steve Morgan, trained their staff in gouda cheese making. Mr. Morgan brought with him the proper recipe, culture and rennet to make this previously unproduced cheese in Georgia.

Discussion with host: The evaluator met with Santa's owner, Ms. Daredjan Kantelidze, to discuss the impact of volunteers on Santa's operations. Santa's first volunteer provided HACCP training to improve Santa's food safety. The volunteer trained Santa in GMP and SSOP, taught the staff to monitor pathogens such as brucellosis, and salmonella to ensure that the milk supply is safe for human consumption, and recommended proper cleaning and sanitizing techniques to ensure equipment is hygienic. While there aren't direct and quantifiable results related to the HACCP training, Ms.Kantelidze explained that Santa is now in position to fulfill the HACCP certification process to potentially export cheese and command a higher price at Tbilisi's supermarkets. Furthermore, a law is being discussed that will require all food processors to become HACCP certified by 2015. As a result of this assignment, Santa is in a strong position to meet any increased government food safety regulation.

According to Ms. Kantelidze, the biggest impact was the introduction of gouda cheese making. Because of the high fat content in summertime milk, Santa's cows are effective for producing the raw material for gouda cheese. The volunteer trained Santa's staff to make gouda cheese and Santa now produces 100kg per day. Santa is currently the only Georgian supplier of gouda

cheese and sells their cheese to Carrefour, resulting in an increase in sales of 1,800 Gel per day. In addition to training Santa's staff on gouda production, the volunteer taught Santa to add and utilize Dannisco rennant to increase sulguni's stretching, and as a result, Santa has seen a 15% increase in cheese yields.

6. Suggestions for Future Implementation

Overall, the evaluator was impressed with the quantifiable and qualitative impacts volunteers had on Tajikistan and Georgia's agricultural sector. The F2F Project provided a transfer of knowledge that will continue to increase the incomes of farmers, cooperatives, enterprises and associations.

Despite an overall successful program, a number of general issues were identified by the evaluator that would make it easier to identify real impact of volunteers in the future.

The evaluator suggests improving the Organizational Capacity Assessment Tool (OCAT), the initial baseline of host capacity. The OCAT is presently used as an assessment of governance and management; however, it does not assess the technical skills of the host. If its use is continued, the OCAT should be modified to address technical skills and updated yearly by field staff as volunteers provide recommendations to hosts.

In the ECCA context it may be useful to create a standard package of tried and tested measures/volunteer inputs that suit a certain level of host. This package of knowledge would allow and require for more immediate evaluation and monitoring at each stage to show that the host has acquired the skills that will improve their circumstances. Implementation will naturally come when their businesses allow.

In the opinion of the evaluator, repeat volunteers add significant more value than first time ones. Repeat volunteers are predisposed to the constraints of the hosts and are able to start the technical work of their assignment from day one. Furthermore, in countries where translators are required, overtime the volunteer and translator build a rapport leading to more efficient and effective assignments.

Wherever possible, F2F should maintain its technical focus higher up in the agribusiness value chain. Volunteers' impact was the most significant when recommendations improved their need to source raw material from local farmers.